REMARKS

Claims 1-17, 19-27, 29-183 and 186-190 are now pending in the above-referenced patent application. Claims 1, 2, 4-7, 15-17, 19-21, 25-27, 29, 64, 68, 72, 76, 80, 84, 88-94, 98, 102, 106, 110, 114, 118, 122, 126, 130, 134, 138, 142-148, 152, 156, 160, 164, 168, 172-174, 177, 178 and 186 have been amended and claims 18 and 28 have been canceled. Applicants respectfully request further consideration of these claims, in view of the amendments set forth above and the following remarks.

Amended Claims

Claims 1, 2, 4-7, 15-17, 19-21, 25-27, 29, 64, 68, 72, 76, 80, 84, 88-94, 98, 102, 106, 110, 114, 118, 122, 126, 130, 134, 138, 142-148, 152, 156, 160, 164, 168, 172-174, 177, 178 and 186 have each been amended to address clarity issues.

No new matter has been added.

Cancelled Claims

Claims 18 and 28 have been cancelled to advance the prosecution of the instant case.

Acknowledgement

Applicants acknowledge that claims 5-6, 16-17, 19-20, 27, 29, 33-34, 37, 39-42, 45[1], 48-51, 54-55, 57-60, 63, 88-121 and 142-171 are considered patentable and would be allowed if rewritten in independent form.

Rejection Under 35 U.S.C. § 112 (Indefiniteness)

Claims 1-183 and 186-190 stand rejected under 35 U.S.C. § 112 as allegedly being indefinite for a variety of reasons. Specifically, the Office action indicates that:

[1] In the list of claims containing allowable subject matter, the Office action lists "45-45" at page 9, paragraph 4. Applicants are unsure if there is additional allowable subject matter from claim 45 or if claim 45 was simply inputted twice.

1) it is not clear if the flow partitioning and pressure partitioning sub-systems of claims 1, 2, 7, 21, 177 and 178 have any structural relationship or requirement relative to placement between the reactors and the source or effluent sink;

2) it is not clear if there needs to be a one to one correspondence between the number of flow restrictors and the number of reactors in claims 1, 2, 7, 21, 177 and 178;

3) it is not clear if there is any difference between the flow restrictors in the flow-partitioning subsystem and the pressure-partitioning subsystem of claims 1 and 2, and that it makes it unclear what the difference in claims 7 and 21 are;

4) it appears that a definite structural relationship is required for the feed-composition subsystem of claims 1 and 2;

5) in claims 4-6 it is not clear if the flow restrictors are in addition to the restrictors of claims 1 and 2;

6) in claims 8, 11-12 and 14 it is not clear what restrictor configuration satisfies the claims;

7) it is not clear in claims 9, 11 and 13-14 if the claim requires a separate set of restrictors for the feed composition subsystem and the flow-partitioning subsystem;

8) it is not clear in claim 18 how the structure is limited;

9) it is not clear in claim 26 if the restrictors can provide a different pressure without additional structure;

10) the plurality of selectable flow restrictors in claims 64-87, 118, 122, 126, 130, 134 and 138 require a means of their selection in order to provide a functioning device;

11) it is not clear hoe the detection system in claims 172-174 are connected to the other claimed structure; and

12) in claim 186, the term "cavity" lacks antecedent basis, it is not clear how the cavities can be anything other than flow cavities, and it is not clear how the feed composition subsystem can function with only four or more flow restrictors.

In view of the following remarks, Applicants request the rejections be withdrawn.

Indefiniteness Standard

The Supreme Court has long held that the primary purpose of requiring definiteness in claim language is to give fair warning to persons in the art of what would constitute infringement. United Carbon Co. v. Binney Co., 317 U.S. 328, 87 L. Ed. 32, 63 S. Ct. 165 (1942). Hence, the appropriate legal standard is whether the claims, read in light of the specification, reasonably apprise those skilled in the art of the scope of the invention. Hybritech Inc. v. Monoclonal Antibodies, Inc., 231 USPQ 81 (1986). However, the specification and prosecution history are relevant in determining whether a specific term has a definite meaning. *See* All Dental Prodx, LLC v. Advantage Dental Products, Inc., 64USPQ2d 1945 (Fed. Cir. 2002).

Claims 1, 2, 7, 21, 177 and 178

The Office action alleges that it is not clear if the flow-partitioning and pressure-partitioning subsystems of claims 1, 2, 7, 21, 177 and 178 have any structural relationship or requirement relative to placement between the reactors and the source or sink or if a one-to-one correspondence between the restrictors and the reactors is required.

Applicants respectfully submit that the specification and Figures makes it clear that the particular subsystems can be located upstream of the reactors, downstream of the reactors, or both. For example, "Flow-partitioning and/or pressure-partitioning is preferably effected using a first set of inlet flow restrictors and additionally or alternatively, using a second set of outlet flow restrictors." Page 16, lines 29-31 (emphasis added), and "The flow resistance of the first set of inlet flow restrictors – and additionally, or alternatively – the flow resistance of the second set of outlet flow restrictors, varies between each of the four or more channels." Page 17, lines 8-10 (emphasis added).

Applicants have amended these claims to recite that the restrictors in the pressure-partitioning and flow-partitioning subsystems are inlet or outlet restrictors and that they are in fluid communication with the reactors. Applicants have also amended the claims to require that each reactor of the four or more reactors is in fluid communication with at least one different flow restrictor from the set of four or more inlet or outlet flow restrictors than the other reactors.

With regards to the composition-feed subsystem, Applicants have amended these claims to clarify the structure of the subsystem.

The Office action further alleges that it is "not clear if there is any difference between the flow restrictors in the flow-partitioning subsystem and the pressure-partitioning subsystem". Applicants respectfully submit that the specification makes it abundantly clear that the restrictors in the flow partitioning subsystem and the pressure-partitioning subsystem can be the same or different, depending on the embodiment. See, for example, page 6, paragraph [014]:

> The flow-partitioning and pressure-partitioning subsystems can be integral with each other, such that each of such subsystems are inherently effected by the same set of inlet flow restrictors and outlet flow restrictors. Alternatively, separate sets of inlet and outlet flow restrictors can be employed to effect the flow-partitioning and the pressure-partitioning subsystems. Various specific configurations are specifically contemplated, including for example, where the set of inlet flow restrictors and the set of outlet flow restrictors are adapted to provide for a different flow rate to each of the four or more reactors, while maintaining substantially the same pressure in each of the four or more reactors. Alternatively, the set of inlet flow restrictors and the set of outlet flow restrictors can be adapted to provide for a different pressure in each of the four or more reactors, while maintaining substantially the same flow-rate to each of the four or more reactors. In a further approach, the set of inlet flow restrictors and the set of outlet flow restrictors can be adapted to provide for a different flow-rate to each of the four or more reactors, and additionally, a different pressure in each of the four or more reactors.

(emphasis added).

See also p. 17, lines 8-10 "The sets of inlet and/or outlet flow restrictors can effect both flow- and pressure-partitioning; alternatively, these could be effected using separate sets of inlet and/or outlet flow restrictors."

Three different embodiments discussed above are explicitly illustrated in Figures 1A, 1B and 1C, in which a system having flow restrictors that provide for a different flow rate to each of the four or more reactors, while maintaining substantially the same pressure in each of the four or more reactors, provide for a different pressure in each of the four or more reactors, while maintaining substantially the same flow-rate to each of the four or more reactors, and provide for a different flow-rate to each of the four or more reactors, and additionally, a different pressure. While the restrictors in each embodiment can be the same, for example, capillary tubes, it is the resistances of the restrictors that determine if the subsystem is a flow-partitioning subsystem, a pressure-partitioning subsystem, or both.

Thus, Applicants respectfully submit that it is clear from the specification that in some embodiments, a set of flow restrictors will be a flow-partitioning subsystem but not a pressure-partitioning subsystem, in other embodiments, a set of flow restrictors will be a pressure-partitioning subsystem, but not a flow-partitioning subsystem, in yet in other embodiments a set of flow restrictors will be both a flow-partitioning subsystem and a pressure-partitioning subsystem. In all three embodiments, the sets of flow restrictors will be structurally different from the sets in the other embodiments, because the restrictors will have specific resistances to flow (which is a structural limitation) that make it a specific type of subsystem.

Thus, Applicants respectfully submit that the claimed limitations are clear, especially in view of the specification, and respectfully request that the rejection of these claims be withdrawn.

Claim 186

With regards to the rejection of claim 186, Applicants have amended the claim to correct the antecedent basis issue for the term "cavity". Applicants have also amended claim 186 to clarify the structure of the feed-composition subsystem.

With regards to the allegation that it is unclear how a cavity can be anything other than a flow cavity, Applicants submit that the specification supports how the cavity can be other than a flow cavity, for example, a batch cavity.

See page 75, paragraph [0154]:

> Each of the aforementioned chemical processing systems (*e.g.*, reaction systems, processing / treatment systems) are preferably flow- systems (*e.g.*, flow reactors, or processing chambers adapted for non-reactive processing) in which a fluid feed is provided to a flow cavity (*e.g.*, a flow reactor cavity), allowed to interact with (*e.g.*, contact) one or more candidate materials of interest (the materials being the same or different in separate channels) under the reaction conditions of interest (or, alternatively for example, pretreatment conditions of interest), and in which an effluent stream is discharged from the reaction cavity. However, the systems can also be batch systems, or semi-continuous systems, with the fluid feed being provided to a batch cavity. In particular, the feed-composition subsystem is well-suited to operations involving batch or semi-continuous systems, as well as continuous systems. For batch operations, for example, the mixing zone can be a well of a parallel batch reactor, a well of a microtiter plate, or a treated or untreated region or area of a plate-type substrate such as a wafer.

(emphasis added).

In view of the above remarks and amendments to claim 186, Applicants respectfully request that the rejection of this claim be withdrawn.

Dependent Claims

The Office action addresses issues in several dependent claims.

First, the Office action alleges that in claims 4-6 it is not clear if the flow restrictors are in addition to the restrictors of claims 1 and 2. Applicants have amended claims 4-6 to clarify that the restrictors are a specific type of restrictor if the subsystem is a flow-partitioning or pressure-partitioning subsystem, and that the restrictors are additional restrictors if the subsystem is a feed-composition subsystem.

The Office action further alleges that in claims 8, 11-12 and 14 it is not clear what restrictor configuration satisfies the claims. Applicants respectfully submit that, as explained above, the specification makes it clear that the pressure-partitioning and flow-partitioning subsystems may be present with only one set of flow restrictors, or may require two separate sets of flow restrictors, depending on the resistance values of the restrictors and other resistances in the system, such as the reactor. In view of the specification, one of skill in the art would readily recognize the scope of the claim.

The Office action further alleges that it is not clear in claims 9, 11 and 13-14 if the claim requires a separate set of restrictors for the feed composition subsystem and the flow-partitioning subsystem. Applicants respectfully submit that the specification makes it clear what resrictor configurations are possible to satisfy the claim elements. "In a flow distribution system comprising a feed-partitioning subsystem, the inlet distribution system 500 can also include a set of feed-component flow restrictors. The feed-component flow restrictors can be the same flow restrictors used as for flow- and/or pressure-partitioning (*e.g.* first set of inlet flow restrictors 510), or alternatively, the feed-composition flow-restrictors can be a separate, independent set of flow restrictors." Page 15, lines 26-30 (emphasis added).

The Office action further alleges that it is not clear in claim 18 how the structure is limited. In order to advance prosecution, claim 18 has been canceled.

The Office action further alleges that it is not clear in claim 26 if the restrictors can provide a different pressure without additional structure. Applicants respectfully submit that the specification makes it clear that the pressure-partitioning subsystem can have outlet restrictors in

addition to or as an alternative to inlet flow restrictors. The downstream resistance will partition pressure in the reactors.

The Office action further alleges that the plurality of selectable flow restrictors in claims 64-87, 118, 122, 126, 130, 134 and 138 require a means of their selection in order to provide a functioning device. In order to advance prosecution, Applicants have amended the claims to require the means for selecting restrictors from the various sets of restrictors.

Finally, the Office action alleges that it is not clear how the detection system in claims 172-174 are connected to the other claimed structure. Applicants have amended claims 172-174 to recite that the detection system is in fluid communication with the outlets of the reactors.

In view of the above remarks and in view of the amendments made to the claims, Applicants respectfully request that the rejections of these claims be withdrawn.

Rejections Under 35 U.S.C. § 103(a) (Hogan, Calleja, Soutgate, Roberts, Brieva and Finley)

The Office action rejects claims 1-4, 7-15, 21-25, 30-32, 385-36, 38, 43-44, 47, 52-53, 56, 61-62, 171-183 and 186-190 under 35 U.S.C. § 103(a) based on Hogan (1971) in view of Calleja (1995), U.S. Patent No. 3,875,499 to Roberts, U.S. Patent 3,753,653 to Brieva, or U.S. Patent 5,304,354 to Finley, and U.S. Patent No. 5,863,502 to Southgate[2].

Applicants respectfully traverse these rejections.

The Office does not establish a *prima facie* case of obviousness.

Independent claims 1, 177 and 186 require a set of four or more flow restrictors that are passive flow restrictors for control of flow, pressure and/or feed-composition to inlets or from outlets of each of the four or more reactors. Independent claims 2 and 178 require that the set of four or more flow restrictors for control of flow, pressure and/or feed-composition to inlets or from outlets of each of the four or more reactors are integral with a substrate or with a microchip body mounted on a substrate. Independent claim 7 requires a flow-partitioning subsystem for providing a different flow rate to each of four or more reactors, the flow-partitioning subsystem comprising at least one set of four or more passive flow restrictors. Independent claim 21

[2] The Office action only mentions Southgate in the initial rejection sentence of the Office action on page 3, paragraph 3. There is no discussion, analysis or conclusion regarding this reference. Thus, Applicants maintain their earlier arguments with respect to this reference.

requires a pressure-partitioning subsystem for providing a different reaction pressure in the reaction cavity of each of the four or more reactors, the pressure-partitioning subsystem comprising at least one set of four or more passive flow restrictors

There is no motivation existing *in the art* that would have led a person of ordinary skill to modify the Hogan reference in a manner that would have led to Applicants' invention. Hogan and Calleja are directed toward screening for heterogenous catalysis, whereas Southgate is directed toward PCR amplification, Roberts is directed to gas detection systems using a single detector, Finley is directed to increasing volume of reaction product by performing the same reaction in several reactors and combining the outlets, and Brieva is directed to the analysis of gaseous components by chemical reaction in the gas phase.. There is no rational basis for combining these references – without using impermissible hindsight.

Hogan teaches a chemical reaction system utilizing a six reactors and mass flow controllers for controlling flow to each reactor. Hogan teaches that the system is best suited for operation at pressures of 0-5 psig. Hogan fails to teach any of 1) a flow-partitioning subsystem for providing a different flow rate to each of the four or more reactors, comprising at least one set of four or more passive inlet or outlet flow restrictors, each of the four or more inlet or outlet flow restrictors either having a flow resistance that varies relative to other flow restrictors in the set or integral with a substrate, 2) a pressure-partitioning subsystem for providing a different reaction pressure in the reaction cavity of each of the four or more reactors, comprising at least one set of four or more passive inlet or outlet flow restrictors, each of the four or more inlet or outlet flow restrictors either having a flow resistance that varies relative to other flow restrictors in the set, or integral with a substrate, or 3) a feed-composition subsystem for providing a different feed composition to each of the four or more reactors, comprising four or more mixing zones, each mixing zone in fluid communication with an inlet port of a different reactor of the four or more reactors and at least two sets of four or more passive flow restrictors, a first of the two sets of passive flow restrictors in fluid communication with a first reactant source and the four or more mixing zones so that each of the four or more mixing zones is in fluid communication with the first reactant source through at least one passive flow restrictor of the first set of flow restrictors, a second of the two sets of passive flow restrictors in fluid communication with a second reactant source and the four or more mixing zones so that each of the four or more mixing zones is in fluid communication with the second reactant source through

at least one passive flow restrictor of the second set of flow restrictors, each of the four or more flow restrictors in a set providing a resistance to flow between the or more reactant sources and one of the four or more mixing zones, each of the four or more flow restrictors in a set either having a flow resistance that varies relative to other flow restrictors in the set or integral with a substrate.

There is absolutely no motivation to combine Roberts, Southgate, Brieva or Finley with Hogan in order to arrive at the claimed invention. In using Roberts, the Office action fails to appreciate that the system of Hogan includes a plurality of reactors having a mass flow controller associated with each reactor, and the system of Roberts uses a plurality of passages, each having a different sized orifice, for delivering different compositions of materials to a single detector. First, the system of Roberts is not used to provide different flow rates to the detector, but different compositions, negating any motivation to replace the mass flow controllers of Hogan. The motivation to provide different flows to each of the individual reactors of Hogan, as is an intended application of that system, by replacing each mass flow controller with a plurality of lines, one for each orifice, would be required to be associated with each reactor. This would require complex design issues and would not be desirable.

Southgate expressly teach that meaningful results are assured by performing multiple, parallel reactions using the same reagents for each sample (See, Col. 2, lines 27-31 of Southgate), which is not particularly relevant to Applicants' inventions (e.g., involving varied feed distribution).

Finley teaches a plurality of reactors, all fed by a single manifold, in which all of the effluent is combined in order to increase the volume of a reaction product. Finley does not teach passive flow restrictors that have different resistances to flow, because Finley wants the same flow, pressure and feed in each reactor. Thus Finley does not teach passive flow restrictors having a different resistance to flow.

Brieva teaches at least two reactors fed by two inlet flow restrictors. While Brieve does not explicitly say whether the resistances to flow of the two restrictors B_1 and B_3 are the same or different, one of skill in the art could conclude that they are the same because 1) the only reaction parameter that is discussed as variable is the temperature, and 2) of the presence of dead volume tube D_3 in order to offset the delivery of the reaction product to the detector. If there were different flow rates, the dead volume tube may not be necessary. Thus, Brieva does not

teach using multiple passive restrictors having different resistances to flow for providing a flow or pressure-partitioning subsystem as claimed.

The Office action combines Hogan with Calleja and attempts to fill in missing voids with teachings from three different references which all fail to teach the claimed invention. While Finley, Brieva and Roberts teach passive restrictors, none of them appreciates using a plurality of restrictors with different resistances to deliver reactants to a plurality of reactors.

In view of the lack of motivation and other deficiencies noted above, the Office action appears to be relying on Applicants' specification to improperly extrapolate the teachings of Hogan, and to improperly combine the teachings of Hogan with arbitrarily selected portions of other references – without proper motivation for such extrapolation and combination existing in the prior art.

In view of the repeated warnings by the Federal Circuit against hindsight reconstruction (*i.e.*, against finding the required motivation in the guidance of the instant specification), Applicants respectfully submit that such extrapolation is improper under the law. See, for example, Grain Processing Corp. v. American Maize-Products Co., 5 USPQ2d 1788 (Fed. Cir. 1988) (stating that obviousness cannot be established by merely showing that each element of the patented products may be found somewhere in the prior art). See also In re Vaeck, 20 USPQ2d 1438 (Fed. Cir. 1991), and In re Dembiczak, 50 USPQ2d, 1614 (Fed. Cir. 1999). See also In re Kotzab, 54 USPQ2d 1308 (Fed. Cir. 2000) (holding that an invention was not obvious, even though based on technologically simple concepts from a combination of known elements, since the there was an absence of a specifically-identified understanding within the knowledge of a skilled artisan that would have motivated one to make the particular claimed invention).

Hence, the inventions would not have been obviousness over the art of record. Applicants respectfully request that this basis for rejection be withdrawn.

Equivalents

The amendments to the claims and the arguments presented in response to the Office action have been made to claim subject matter which the Applicants regard as their invention. By such amendments, the Applicants in no way intend to surrender any range of equivalents beyond that which is needed to patentably distinguish the claimed invention as a whole over the prior art. Applicants expressly reserve patent coverage to all such equivalents that may fall in the range

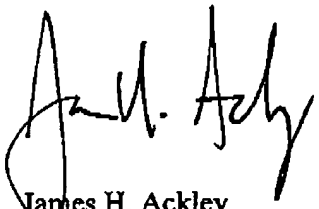
between applicants literal claim recitations and those combinations that would have been obvious in view of the prior art

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

The Examiner is hereby authorized to charge the fees required in connection with this Amendment D to Deposit Account No. 50-0496, in accordance with the Transmittal submitted herewith. The Examiner is also authorized to debit any other fees required in connection with this application, or to credit any overpayment of fees in connection with this application to Deposit Account No. 50-0496.

Respectfully submitted,



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